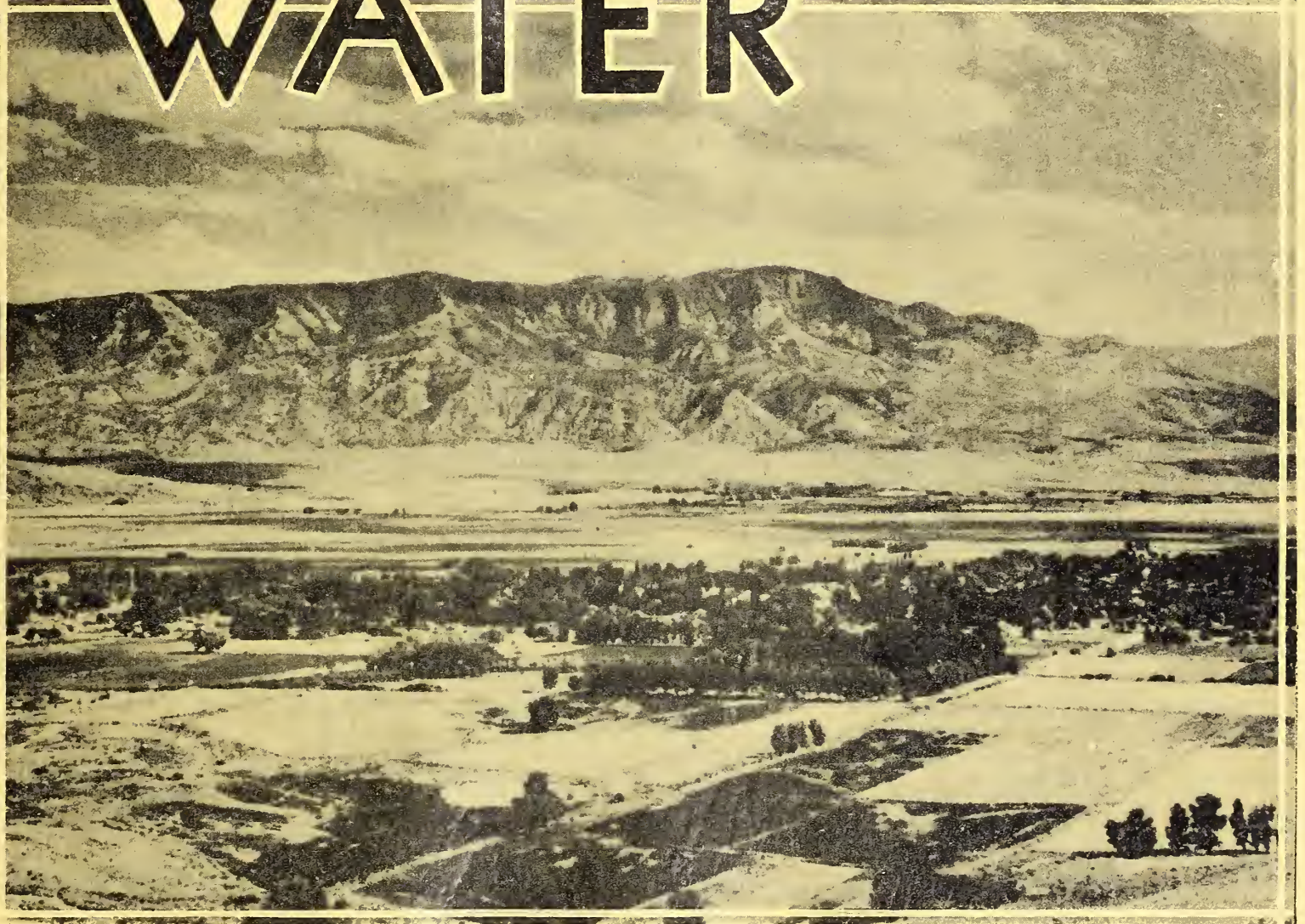


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MOUNTAIN WATER



and the TOWN



Intermountain Region

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MOUNTAIN WATER

AND THE

TOWN



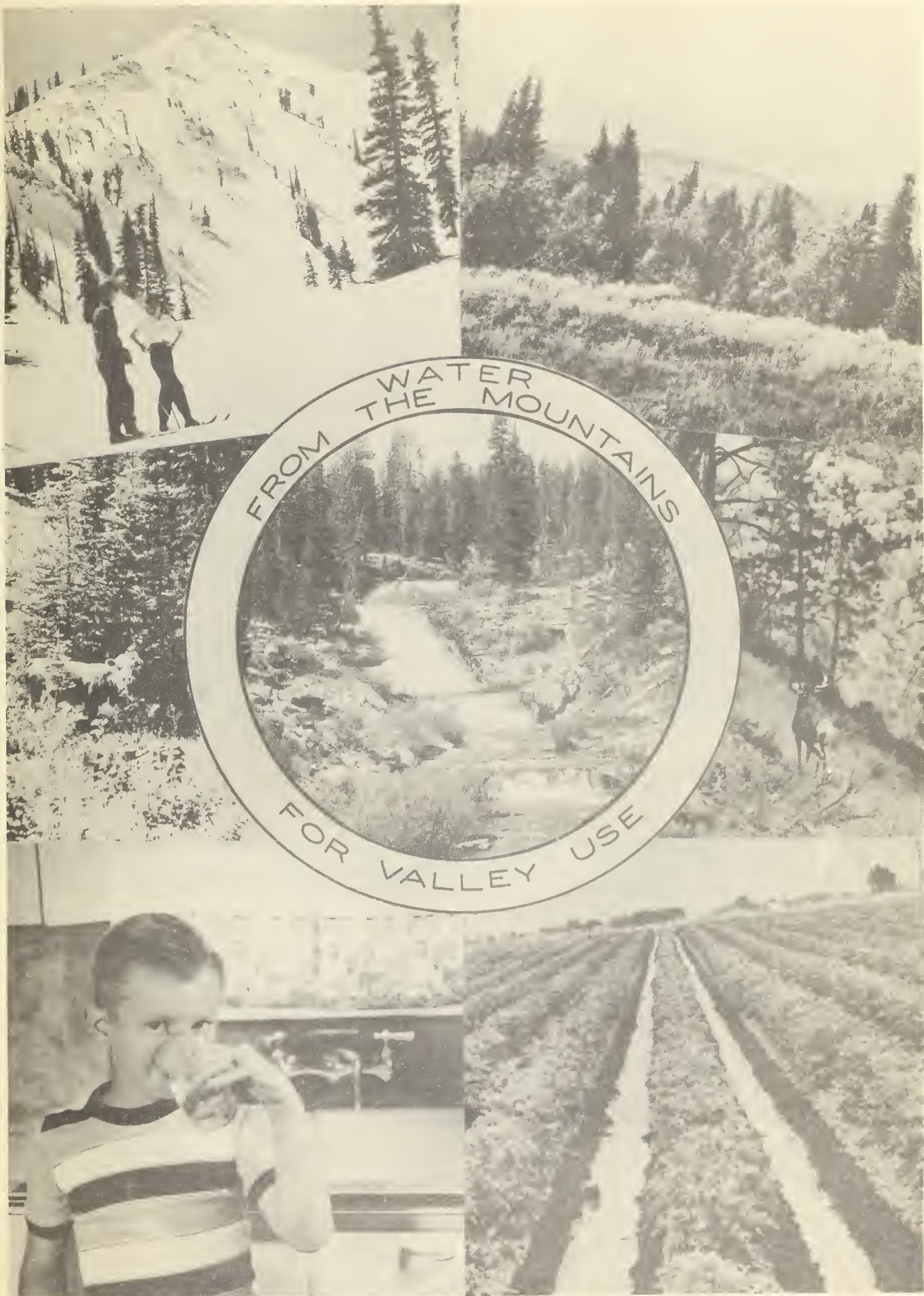
Towering majestically above the plains our western mountains hold the power of life and death over valley civilization.

Water is the power these sky-scraping masses hold over man.

Rainfall in the semiarid valleys and foothill lands averages a scant 6 to 15 inches per year.

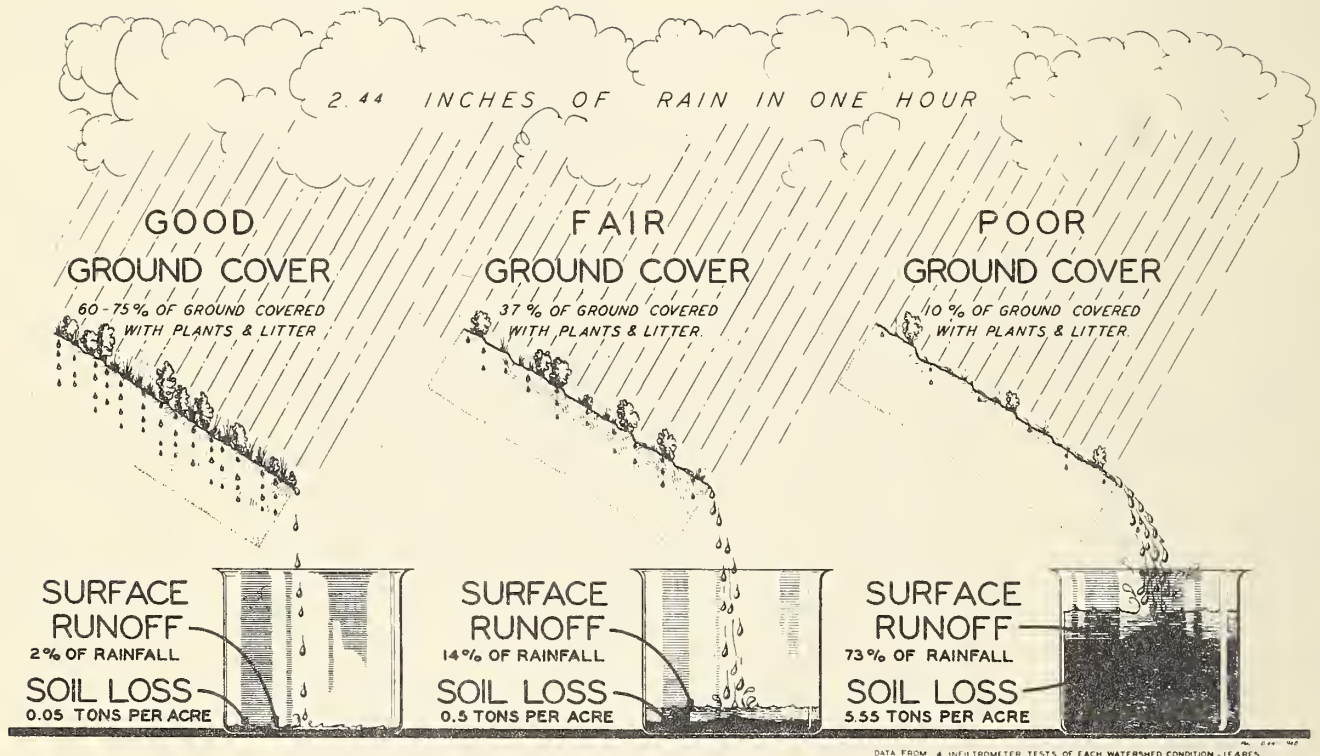
BUT - rising steeply above lowlands and valleys, the mountains blockade western cloud trails and capture from two to three times as much moisture. These mountains are humid islands in a vast desert.

Additional moisture captured by the mountains can be delivered in one of two ways to the thirsty cities, towns and farms clustered around the mouths of narrow canyons. Water can come down in clean, constant-flowing quantities, or, in erratic death-dealing floods, and the manner of delivery depends directly upon how we ourselves use or misuse the mountain.



RAINSTORM RUNOFF & EROSION UNDER VARYING WATERSHED CONDITIONS

SUB-ALPINE RANGE, EPHRAIM WATERSHED, UTAH



Nearly all of the usable water for homes, farms, power and industries in the Intermountain West comes -- not from cloudburst summer rains, but from winter snows and gentle spring rains.

Some summer rains fall gently on the mountains and are beneficial. Others are of the cloudburst type where rain pours down suddenly at great rates for brief periods.

The chart shown above illustrates what happens when cloudburst rains strike a mountainside well covered with vegetation as compared to a slope that has a poor ground cover. Intense rains beating down on a mountain slope that has been stripped of plants and litter cannot filter through the soil. The water runs off, is lost, and topsoil is lost with it. This is the forerunner of gullies and destructive floods.

On the following pages are shown examples of what
has happened on watersheds of the Intermountain Region.

WILLARD, UTAH WATERSHED.



A SUMMER FLOOD VISITS WILLARD.

Following a combination of overgrazing, burning, and overcutting of timber, the first serious mud-rock flood spilled off the Willard Watershed on August 13, 1923. Between 1923 and 1936 a series of disastrous floods from the denuded watershed followed in ruinous succession, resulting in:

DEATH TO TWO WOMEN WHO WERE CRUSHED IN THEIR HOMES
FORTY HOMES DAMAGED OR DESTROYED
MUNICIPAL POWER PLANT COMPLETELY DESTROYED
MUNICIPAL WATER AND IRRIGATION SYSTEMS IMPAIRED
ORCHARDS AND TRUCK GARDENS RUINED
HIGHWAY 91 BLOCKED FOR TWO-WEEK PERIOD
TOTAL LOSSES, TANGIBLE AND INTANGIBLE, MORE THAN
\$500,000.

Soon after these floods, Willard citizens recognized misuse of vegetation on the mountains above town as the cause of their trouble. In 1936 they took action. First -- a program of purchasing the misused private lands on which the floods were originating. This cost \$6300, which was raised locally. Second -- the lands were donated to the government, made a part of the Cache National Forest and placed under management of the U. S. Forest Service. This move was necessary to make it possible to start on the extensive land rehabilitation program.

Once placed in public ownership, the Forest Service contour-terraced, reseeded, and planted trees on the land at a cost of approximately \$100,000. Scars on the watershed have gradually healed and damaging mud-rock flows have not recurred.



SOIL LAID BARE TO THE STORM.

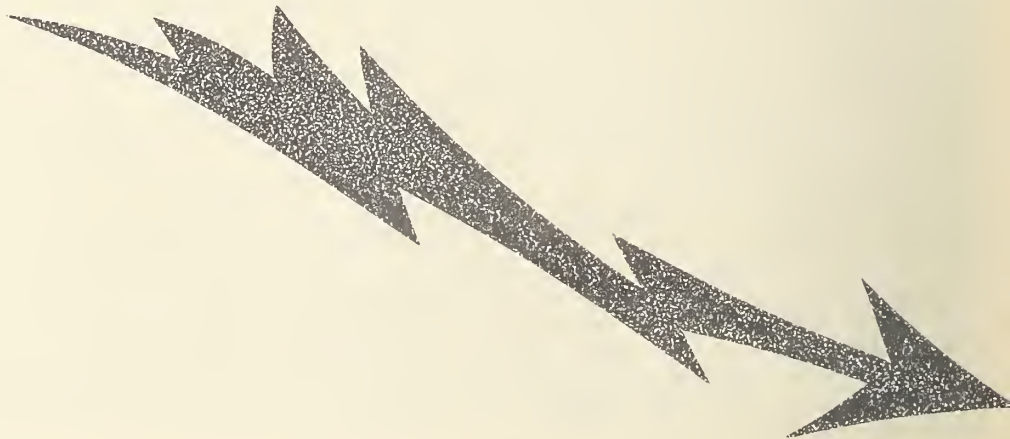


THE SAME HILLSIDE , BUT PLANTS NOW SHIELD THE SOIL .

MT. PLEASANT, UTAH WATERSHED.



PLANT COVER WORN THIN --





A MUD - ROCK FLOOD HIT MT. PLEASANT.

Mt. Pleasant, Utah, was settled in 1859 near the mouth of Pleasant Creek. Since 1893, twelve floods have originated on the watershed which Pleasant Creek drains.

The most recent flood, a deluge of boulders, mud and rocks descended on Mt. Pleasant citizens on July 24, 1946, as they assembled to celebrate the 99th anniversary of the arrival of Mormon pioneers in Utah.

This, the most disastrous flood of all, originated high on the mountain above the town. Rain fell at a high rate on overgrazed lands for about one hour. This was not freakish intensity for summer storms in the Mt. Pleasant area, but hitting as it did on bare headwater lands, it:

DID EXTENSIVE DAMAGE TO HOMES, BUSINESS HOUSES, AND
MERCHANDISE.

FILLED BASEMENTS OF BUSINESS HOUSES AND HOMES WITH MUD.
DEPOSITED THICK MUD, ROCKS AND BOULDERS ON 50 ACRES OF
LAWNS, PARKINGS AND GARDENS INSIDE MT. PLEASANT CITY
LIMITS AND ON 100 ACRES OF FARMLAND - IN PLACES 4 FEET
DEEP.

RUINED CROPS, KILLED POULTRY AND LIVESTOCK.
BLOCKED STREETS AND HIGHWAYS AND DESTROYED BRIDGES.
WASHED OUT CITY WATER SYSTEM AND CONTAMINATED WATER.
DESTROYED IRRIGATION DIVERSIONS AND DITCHES.

A TOTAL DAMAGE BILL OF \$106,100

Overgrazing of the Pleasant Creek watershed in the early days by too many sheep, cattle and horses was held chiefly responsible for the flood.

Careless burning and overcutting of timber also contributed. Vegetation removed from slopes above Mt. Pleasant was never replaced. Rebuilding the waterholding power of the mountains above town will require removal of livestock from the critical areas for an indefinite period. Contouring and revegetation will also be necessary.



WHO PAYS THE BILL ?

THE SALT LAKE CITY FLOOD OF 1945.



FUNNEL FOR FLOODS.



WASATCH BOULEVARD.

In the early days, perennial grasses on the steep slopes above Salt Lake City were overgrazed and gradually replaced by cheatgrass, a highly inflammable annual. Repeated fires through the years burned the remaining shrubs as well as the cheatgrass.

On July 31, 1944, a match carelessly dropped in the cheatgrass started a flash fire which laid bare 600 acres of steep land before it could be controlled.

On August 19 of the following year, an intense rain-storm struck these fire-denuded slopes. A flood which caused \$346,000 damage swept down. Headstones were overturned and caskets washed out of graves where the flood crossed the City Cemetery.

When the flood stopped, people "dug out." Some sold their homes and "moved out."

The hazard still exists. Safety can be attained only through contour trenching, reseeding, emergency debris basins, and intensified fire protection.

During this same storm, unburned patches within the same watershed produced no flood runoff, although they received equally intense rainfall.

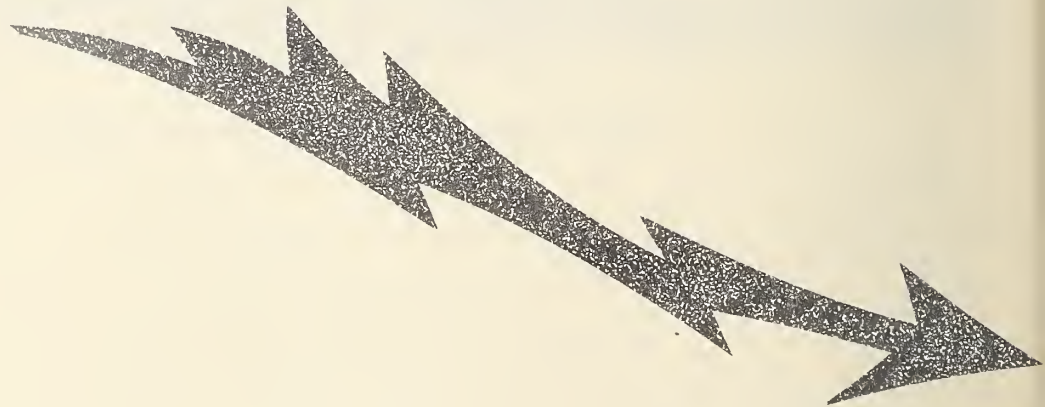


SALT LAKE CITY CEMETERY - SORROWS RENEWED.

DAVIS COUNTY WATERSHED.



PARRISH CREEK HEADWATERS.





SCHOOL FLOODED OUT ! CLASS DISMISSED.

About the same time floods were damaging Willard, Utah, mud-rock floods were also taking their toll in Davis County. A series of floods between 1923 and 1930 --

TOOK SIX LIVES.
WRECKED SEVEN SUBSTANTIAL HOMES AND DAMAGED OTHERS.
SERIOUSLY DAMAGED A LARGE SCHOOL.
DAMAGED WATER AND IRRIGATION SYSTEMS.
BLOCKED ROADS, RESULTING IN INTERRUPTED TRANSPORTATION
AND HEAVY REPAIR COSTS.
COVERED VALUABLE FARM AND ORCHARD LAND WITH GRAVEL,
ROCKS, AND BOULDERS.
SERIOUSLY DEPRECIATED PROPERTY VALUES THROUGHOUT THE
FLOOD-STRUCK AREA.

Davis County watershed lands in private ownership had been severely overgrazed and carelessly burned for several decades. Floods during the 20's aroused people living close to the mouths of the canyons. With the terrible mud-rock flood of 1930, fright and indignation among the valley dwellers reached a peak. Private watershed holdings on which the floods originated were purchased at a cost of \$39,000.00 and placed in public ownership. About \$60,000.00 more was spent for other adjacent private lands declining in plant cover and needing protection. All grazing was eliminated indefinitely from critical headwater areas and strict fire control measures clamped down. About a quarter million dollars then went into contour trenching, emergency debris basins, and reseeding.

Davis County Watershed today stands out as an example of misused watershed land that has been improved. Had the land been properly used and protected, the accumulated sorrow, deaths, property losses and restoration costs could have been spared.



HORNET CREEK - 1936.



HORNET CREEK - 1946.

THE CHALK CREEK WATERSHED.



BEFORE - - -



AND AFTER MAN'S ABUSE.

A front page story carried by the Fillmore, Utah "Progress Review" of July 14, 1896 read as follows:

FILLMORE VISITED BY TERRIBLE FLOOD.

In looking over the ground this morning, the potent evidence that a calamity has befallen our city is before us. Many homes that yesterday were surrounded with everything to make the heart glad with prospective harvest are now standing in a sea of mud from one to two feet deep.

From the rock bridge on Main Street to the last house on the north, about a half mile away, teams have to wade knee deep in a slimy mass of thick

mud Grain and gardens are destroyed from the top of the city waters to the field miles below. The creamery is surrounded with mud and debris and inside, the two lower shelves filled with cheese and butter are buried in the same filth. Hogs, chickens and some cattle were seen to go down the stream The flood came at 4 p.m. from our mountain stream which is called Chalk Creek.

Mud-rock floods continued to plague the people of Fillmore through the years that followed. The damage cited above is typical of that which came with each flood.

In 1906, the Fillmore watershed was added to what is now the Fishlake National Forest. By that time, however, so much soil had been washed off the mountain slopes, natural healing was and still is almost imperceptible. A threat still exists to 26 homes and the municipal water supply intake lying below the unhealed flood menace area. Costly contour trenching, reseeding and close protection from grazing for many years will be necessary to restore a protective plant cover on watershed slopes and ridges.

THE SPANISH FORK WATERSHED.



1944 - FLICK OF A MATCH.



1945 - FLOOD ON THE FARM .

A FIRE AND A FLOOD.

A cigarette or match carelessly dropped one dry October day in 1944 was the indirect cause of a ruined alfalfa field. The fire started just below the old Castilla Resort in Spanish Fork Canyon and raced up the steep hillside to burn 80 acres of oak brush. It travelled fast in the cheatgrass which had replaced the native bunchgrass depleted through overgrazing.

On August 16, 1945, before the burned area had time to become revegetated, a heavy shower, typical of our intense summer storms, hit the watershed. From this burned area, mud, rocks, and debris were swept down to the valley and came to rest on an alfalfa field adjoining the highway. No mud-rock flow came from adjoining unburned land although it received rainfall as intense as did the burned area.

MEADOW VALLEY WASH FLOOD. NEVADA.



... FLOOD CONTROL STRUCTURES CRUMBLE LIKE SODA CRACKERS.



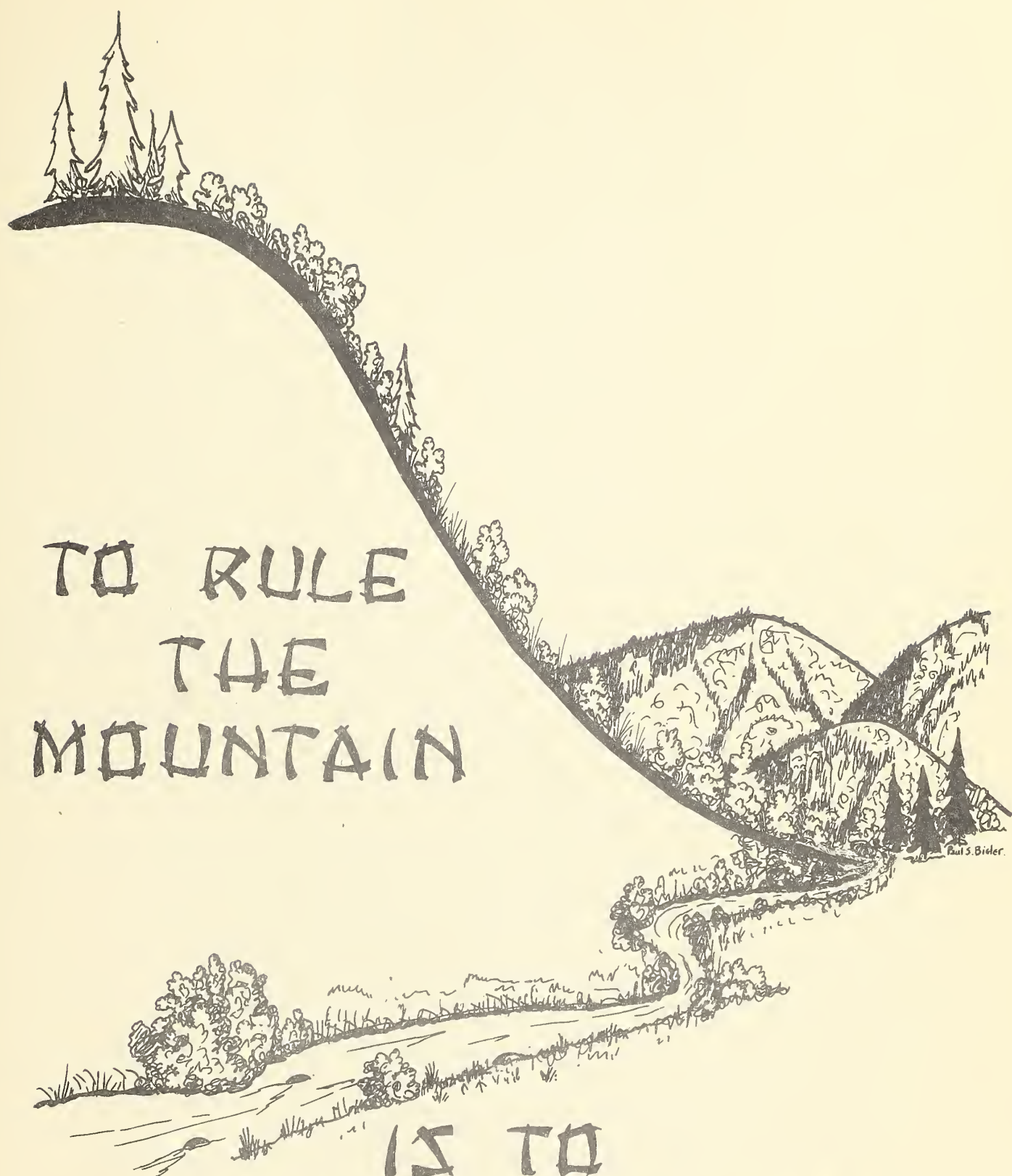
RECURRING FLOODS GOUGE DEEPER AND WIDER WASHES.

Since 1906 floods from the Meadow Valley Wash, Muddy River and side wash drainage areas in Nevada have been a plague on the country. A series of floods from side washes into Moapa Valley have occurred every few years. Losses since 1910 to railroad property and farm lands exceed six and one half million dollars.

In 1938 a flood, originating on overgrazed and burned over range, caused \$167,000 damage to farm lands along Meadow Valley Wash. Damage to the railroad exceeded \$200,000.

These repeated floods have reduced the area of farm lands along Meadow Valley Wash about 50 percent. Silt is carried down in large quantities and deposited on farm lands of Moapa Valley and in Lake Mead.

Danger of floods originating on overgrazed or burned upstream land can be minimized only through proper land management. Plant cover must be restored so that soil can be held on the steep slopes.



TO RULE
THE
MOUNTAIN

IS TO
RULE THE RIVER.

ANCIENT CHINESE PROVERB.

